

We claim:

1. A method of forming a coating of a precious metal on a ceramic substrate, the method comprising a step of forming a ceramic substrate having pores at a surface of the substrate; a step of forming a solution of a salt of a first metal in an organic solvent which wets the ceramic; a step of forming nucleation sites on the surface of the substrate, said step of forming nucleation sites including wicking the solution into the pores at the surface of the substrate; and thereafter an electroless plating step of plating the precious metal onto the surface from an aqueous plating bath.

10 2. The method of claim 1 wherein the organic solvent is volatile.

3. The method of claim 1 wherein the organic solvent is acetone.

4. The method of claim 1 wherein the first metal and the precious metal are the same.

15 5. The method of claim 1 including a step, after wicking the solution into the pores at the surface of the substrate, of heating the substrate to drive off the solvent and reduce the salt to a 0.01 to 0.5 micron layer of the first metal with numerous unplated areas.

6. The method of claim 1 wherein the substrate is a body of an automotive lambda oxygen sensor.

20 7. The method of claim 6 the method further comprises forming an elongate body formed of a solid electrolyte compact, thereafter a step of drilling an axial cavity in the body, and thereafter a step of firing the body to densify it.

8. The method of claim 7 wherein the body is formed by uniaxially compressing a zirconia powder into a thimble having a tapered bore, and then drilling out the tapered bore to form a substantially cylindrical cavity.

9. The method of claim 1 wherein wicking the solution into the pores of the body comprises dipping the body in a solution of platinum salt in a volatile solvent.

10. The method of claim 9 wherein the platinum salt is hexachloroplatinic acid.

11. A method of forming a solid electrolyte cell portion of an automotive lambda oxygen sensor, the method comprising forming a solid thimble-shaped ceramic body, depositing a porous layer on an outer surface of the body, activating the porous layer on the first surface of the body to form a plurality of growth points for a conductive layer on the first surface, growing a first electrode by electroless plating of a conductive layer on the activated porous layer on the outer surface of the body, and forming a second electrode on an inner surface of the body.

12. The method of claim 11 wherein the body is formed by uniaxially compressing a zirconia powder into a thimble.

13. The method of claim 11 wherein activating the porous layer on the first surface comprises wicking a metal salt carried by a volatile liquid into the porous layer.

14. The method of claim 11 wherein growing a first electrode comprises immersion of the porous layer on the first surface in an unstable solution of a salt of a metal.

15. The method of claim 14 wherein the unstable solution further
5 comprises a reducing agent

16. The method of claim 15 wherein the reducing agent comprises hydrazine.

17. The method of claim 15 wherein the salt is hexachloroplatinic acid.

18. The method of claim 15 wherein the solution comprises a platinum salt
10 in a volatile solvent.

19. The method of claim 18 wherein the volatile solvent comprises acetone.